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the other species is an elongate oval. The tendency in the genus has been to complicate the premolars and shorten the tubercular in the course of time. The smallest species is the *D. darwkinsianus* (Fig. 30), from both the Big Horn and Wind River beds, an abundant and acute-toothed species. The largest species is the *D. altidens* Cope, whose jaws are more robust than those of the coyote.

I append the following table showing the distribution of the genera of Creodonta in the North American Tertiary formations :

	EOCENE				OLIGOCENE
	Puerco	Wasatch	Bridger	Uinta	White River
Amblyctonus.....					
Mesonyx.....					
Sarcothraustes...					
Dissacus.....					
Hyænodon.....				?	
Miocænus.....					
Triisodon.....					
Diacodon.....					
Stypolophus.....					
Didelphodus.....					
Chriacus.....					
Deltatherium....					
Ictops.....				?	
Mesodectes.....					
Leptictis.....					
Esthonyx.....					
Oxyæna.....					
Protopsalis.....					
Patriofelis.....					
Miacis.....					
Didymictis.....			?		

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A WALK THROUGH THE NATURAL HISTORY MUSEUM AT FLORENCE.

BY JAMES S. LIPPINCOTT.

SOUTHWARD from the great Pitti palace in Florence, on the Via Romana, which, like all other roads, leads to Rome, stands a structure whose exterior is but an indifferent exponent of the treasures within. Unlike the palace near at hand, which

rises from cyclopean walls and spreads its wings grandiosely and lifts its vast stories forty feet in height, the structure to which we propose to introduce the reader, is unpromising in the extreme. The eye of architectural taste would appear to have been effectually closed while the façade was reconstructing, and every order and all order ignored. Windows of many forms and proportions have been thrown together as though they were the remnant of the stock of a dealer in old frames, and the singular effect thus produced must be seen to be fully appreciated. The inevitable barred windows in the *piana terrena* (ground floor) tell a story of former pretension to some dignity if not to opulent elegance, for the structure was once a palace. Though of unprepossessing exterior, this building is to us most interesting and attractive, and, we may add, one of the most creditable to the intelligence of Florence, not because of any treasures of art that it holds, but for its treasures of Science, its illustrations of her struggles and triumphs: "The life of nature is better than the dead bones of art."

Over a high portal and carriage entrance, observe an inscription and mark the purpose of this rude building, "R. Museo di fisica e Storia naturale." Behold, we are at the door of the Academy and Museum of the Physical and Natural Sciences, and are ready at once to enter. Within, a wide court open to the sky, appears, and lofty gray columns around sustain the heavy walls above.

We find ourselves in an old-time palace, fortunately no longer the abode of opulent imbecility, but devoted to noble purposes. We gaze around: what is that great black globe that stands solemn and alone in yon far corner of the colonnade? Approach! Some remnants of gilding, upon which a few faint lines appear, attest that it was once a terrestrial globe, and displayed, perhaps, all the geographical knowledge of the era which gave it birth. Alas! how sadly in eclipse does it now appear. That old globe has revolved upon its axis for three centuries, and owes its origin to Ignazio Danti, a Dominican monk, who made the astronomical instruments still to be seen on the façade of the Church of Maria Novella. It once stood in the Palazzo Vecchio, and having been fingered by thousands, until the boundaries between land and sea were no longer discernible, was passed over to the museum and turned out of doors, happily, perhaps, for the reputation of the geographer of the Grand Duke Cosmo I., whose knowledge of the New World in 1550, must have been rather hazy. It how-

ever attests the acceptance of the theory that the earth is a globe, and that men can stand at the antipodes, though we find no Scripture authority for this belief, once esteemed the *unpardonable sin*.

A weather-stained bust of Galileo, green with abundant algæ, stands upon a pedestal at the rear of a court open to the sky, but in the halls above he is honorably enshrined.

Broad easy steps invite us to ascend—but stay! We cannot pass that colossal marble statue whose face bears the impress of questioning thought. We need no name beneath to tell us its significance, the siphon barometer in his hand and his earnest introversion assures us that it is Toricelli reflecting upon the vacuum that bears his worthy name.

Ascend—if you are a naturalist, or love the book of nature and would read her story—you need no further invitation. At the head of the first flight, doors open into the hall of the botanical museum, lecture-room and herbaria, which lie in succession beyond. On the left of the outer door stands a marble bust of Amerigo Vespucci, the appropriateness of whose position we did not discover. In the first hall large glazed cases line the walls, in which are displayed magnificent specimens of fossil palms, calamites, &c. Among these may be named *Phœnicitis vettinoides* from the Tertiary of Vegroni, three feet long; *Flabellaria major* from the Miocene of the same locality; *Latanites gigantea*, *Sassafras ferretianum* from Sinigalia; *Laurus oreodaphnifolia*, all from the Miocene of Italy; *Ficus tetrafolia* from Ceningen, Switzerland. A photograph of the fossil *Pinites protolarix*, thirty-six feet in circumference, and now in the botanical garden at Breslau, hangs upon the wall.

Beyond the room we found a collection of natural vegetable products and illustrations of strange tropical and other plants of an extraordinary character, exceedingly interesting and apparently quite as complete as that at Kew. Here were exhibited, readily accessible, giant specimens of *Dicksonia antarctica*, split open to show the peculiar growth of this New Zealand tree-fern; the *Xanthorrhœa arborea*, or grass-tree, of Queensland, Australia; *Raphia ruffia* from Madagascar, exhibiting remarkable clusters of obovate, brown, smooth cones from above large scales, leaf-like and singular; *Amorphophallus titanum* from Sumatra, two feet high and eight inches in diameter, resembling a giant cluster of

ripening dates, an extraordinary product, preserved in spirits; *Macrozamia spiralis* from Melbourne, with its giant rhizoma, and others quite interesting and instructive. Large horizontal cases filled with Fungi in colored plaster, and the minute fungi which attack the vine and the rose, *Oidium tuckeri*, &c., are represented in wax in gigantic proportions, the work of a master hand. A magnificent illustration of the structure of the flower of a gourd and the process of fecundation of an orchid are also to be seen here, and can be readily studied. These offer admirable subjects for class illustration, while they are attractive to the least scientific. The collection of specimens in these wall cases is rich in Coniferæ, and many of this family from California wore quite a familiar aspect. The wonderful *Welwitschia* from Africa may be seen among the Gnetaceæ upon these richly-furnished shelves.

On entering the halls, or saloons, containing the herbaria, my eyes first fell upon Loganiaceæ, named in honor of James Logan, of Philadelphia, the faithful friend and confidential agent of William Penn, one of the most learned men of his day and author of a treatise on the sexual character of *Zea mays* (Indian corn). This treatise (*Experimenta et Meletemata circa Plantarum Generationem*, 1739) was so far in advance of the age as to be rejected by the Philosophical Society of London, but having been printed by Dr. John Fothergill, at Leyden, it was admitted to be of great value to botanical science, which had not yet accepted the doctrine of the sexuality of plants.

With kind courtesy I was conducted by Professor Theodore Caruel, the learned director of the botanical department, through the great halls devoted to the preservation of the herbaria. These collections much exceeded my expectation, and the manner in which they are arranged should serve as a model for imitation by similar institutions. On shelves around the walls of the two large saloons, the fasciculi containing the dried plants are arranged in natural orders, and so classified that in a few minutes any specimen can be found; each is attached to its label, which is pinned to a sheet of stiff paper so that the plant can be examined and studied without detachment from its definitely ascertained name. The number of species here arranged is not yet known, since the collection is in process of reëxamination and enumeration by Professor Caruel. Here may be seen those presented to the museum by

Philip Barker Webb. This botanist had traveled extensively over a large portion of Europe and Asia Minor, accompanied by Berthollet, and together they published a volume on the Canary islands, where he had for several years resided. Having visited Florence, in 1848, he was so much impressed with the value of its botanical collection, and with the interest in the museum shown by the Grand Duke, that he bequeathed his rare herbarium to the prince, and endowed the botanical section with an annual income to aid in its extension. His botanical library of 5000 volumes is fitly arranged in an adjoining room, and ranges from Theophrastus to Gray, through Bauhin and Miller and the bulky Herbals, and long lines of the *Botanical Magazine* and many other serials. I was glad to see that several recent volumes of the AMERICAN NATURALIST, handsomely bound, had been added to the collection.

The herbarium of Webb is said to have contained eighty thousand specimens. What tales they could tell of wanderings in the far-away wilds in which they grew, of weary travel amidst deserts, forests, swamps and on Alpine heights, by enthusiasts prompted by the genius of science. None but the devotee to botanical research or the mania for collecting, can know the joys of the discoverer of unknown plants. To find a species hitherto undescribed, or better still, the representative of a new genus, with the faint hope that some light of botany may recognize his devotion and immortalize him by giving his obscure name thereto, thrills him with a joy unknown to common mortals. Webb is fittingly commemorated in a marble bust placed in the full light of a window, in the hall devoted to the display of vegetable products, and again on canvas in the gallery of his unique library. In the latter he is represented as a ruddy Englishman of honest, kindly, beaming countenance that glows with the enthusiasm that might have sat thereon while regarding for the first time some hitherto unknown plant in full flower.

Here I had the pleasure of looking through the oldest known herbarium,¹ that of André Cæsalpini, which, according to the

¹ This is the oldest known herbarium, unless the recently discovered garland on the mummy of Amenohotep I, be regarded in the character of a "hortus siccus." These garlands are, for the most part, in as perfect preservation as if in a herbarium. Among these ancient Egyptian plants, *Delphinium orientale*, *Nymphaea cerulea*, *Nymphaea lotus* and *Carthamus tinctorius* have been satisfactorily determined from the petals and sepals which were found arranged in rows and attached to willow

dedication in his own handwriting, to his patron, Bishop Tournabuoni, was made in Pisa in 1563. This herbarium has been bound in three thick folio volumes, and contains 767 specimens of plants. One of them, however, proves to be a zoöphyte (*Sertularia*). No attempt at classification appears therein. Greek and Latin names are appended to many of the specimens, which are generally well preserved, though a few have disappeared. This herbarium has been ably described and catalogued by Professor Theodore Caruel, the learned director of the botanical department, in his work entitled, "*Theodori Caruelii, Illustratio in Hortum Siccum Andreae Caesalpini. Florentiæ, MDCCCLVIII.*" His dedication of this volume to his father's memory breathes so grateful a sense of filial regard, and is withal so beautiful, that we cannot refrain from presenting it to the reader. May it influence other parents to encourage their sons to pursue the noble paths of natural science, and thereby save many a youth from the snares that beset adolescence: "*Tuo nomini tuæque memoriæ Constans Theodore Caruel, parens optime venerande cujus potissimum consensu et ope naturalium disciplinarum studia ab ipsa adolescentia excolui, primum huncce laborum meorum fructum pio gratoque animo volens libens inscribo.*"

In the cabinet which contains the precious herbarium above referred to, stand also upwards of sixty large folio volumes bound in parchment, a mode much in favor in Italy. These are the manuscripts, &c., of Micheli, many of which have not been edited. To this botanist we owe the discovery that Fungi are truly vegetable organizations, and several colored drawings of these plants may be seen in his herbarium. As he lived during the first thir-

leaves (*Salix salsaf*) by means of thread of the date-leaf, the whole forming a garland. The dried fruit and yellow blossoms of *Acacia nilotica* were also found, and on some of the other mummies fine detached specimens of blue and white lotus, with stem, blossom and seed-pods complete. Upon another was found a lichen (*Parmelia furfuracea*), a plant indigenous to the islands of the Greek archipelago, and which must have been brought to Egypt B. C. 1100 or B. C. 1200. It is sold by the native druggists at this day.

These frail relics of the past have been arranged for the Boolak Museum, classified, mounted and illustrated by modern examples of the same flowers and plants, and fill eleven cases—an unique collection. The hues of these old-world flowers are said to be as brilliant as those of their modern illustrators, and were it not that the tables show them to be 3000 years apart, no ordinary observer could distinguish between those buried with the Pharaohs and those gathered and dried but a few seasons since.

ty-seven years of the eighteenth century, he was a precursor of Linnæus. Busts in marble of the elder De Candolle and of Micheli adorn this cabinet—the first of massive feature, the latter keen of aspect with his aquiline nose and cowed brow.

In addition to Webb's vast collection there may here be seen the plants of Pavon from Chili and Peru, those collected by Labillardiere, who accompanied La Perouse to New Holland, and of Desfontaines and Mercier in Tunis and Algeria. Labillardiere having been taken prisoner by the Dutch and his collection brought to England, it was, through the generous intervention of Sir Joseph Banks, restored unopened, "lest," as Sir Joseph wrote to Jussieu, "a single botanical thought should be taken from him who had gained them at the expense of his own life." Noble Sir Joseph!

The Florentine museum is rich in fossil plants, some of which, it is said, are not represented in other cabinets of Europe. Among the 4000 valuable specimens the more noteworthy are from the Carboniferous near Volterra, and fossils from Sinigaglia, the Miocene of Tuscany and the Permian of the Brescian territory and a splendid collection of palms from Verona and Vicenza, and impressions of plants from the lava of Lipari. A great collection from the Miocene of Switzerland, illustrated by Dr. Heer, is also exhibited conspicuously.

One of the early and earnest co-laborers in the department of science, was Dr. Targione Tozzetti,¹ grandfather of the present distinguished Professor Targione, director of the invertebrate section of this museum. At the age of twenty-three he was appointed professor of botany under Micheli at Pisa, and afterwards director of the botanical gardens at Florence. He was also librarian of the Magliabecchian library, and arranged the vast number of volumes bequeathed to the city by the eccentric collector and wonderful linguist whose name it bears. Dr. Targione Tozzetti traveled through Tuscany collecting materials for his great work on the agriculture, natural history, art and antiquities of his native country, but the more important work of this man of encyclopædic mind, was his last, on the Progress of Physical Science.

In the botanical museum Professor Parlatore, the late director

¹ Professor Targione Tozzetti and Micheli have received fitting commemoration in Santa Croce, the Westminster Abbey of Florence.

of the botanical department, is commemorated in marble, and stands in friendly opposition to the generous enthusiast Webb.

A walk through the botanical gardens and greenhouse proved very interesting; the former especially, since it served to indicate the character of the winters that have permitted *Chæmerops humilis* to grow thirty feet high in the open air, grand clumps of *Nerium oleander* to flourish unscathed, and giant *Lagerstræmia indica*, rivaling our quince trees in size, to exist without protection. Pampas grass also endures the winters here unguarded from snows and cold. The Botanical gardens adjoin the Boboli garden of the Pitti palace, but are not generally open to the strolling visitor. A much larger space has recently been devoted to the construction of new gardens for the scientific arrangement and study of plants, which lies near the "Institute for higher studies" on the Piazza San Marco. The street upon which it opens is appropriately named Via Micheli.

Passing for the present the grand Tribune of Galileo, which is entered at the western end of the corridor, the middle door of which has given us access to the Botanical hall, let us ascend to the second piano (the third story of the American). Before us, over the entrance to a series of rooms, we read, "Regno Animale," and observe on the right a marble bust of Fontana, the early scientific projector and arranger of this museum, and on the left a bust of Leopold I., the then reigning Grand Duke of Tuscany, whose warm interest in science made him its liberal patron. A wide doorway invites, through which we discern others opening between successive minor departments, whose walls are covered with glazed cases, in which are exhibited a large collection of objects of scientific interest. We enter unchallenged by the guard, and are within a small room devoted to zoöphytes, and find ourselves at the base of the scheme of animal existence, or at that section of it that can be illustrated by mural specimens for popular instruction.

Having entered, we quietly soliloquize—here we have found a museum in which some presiding mind has guided the exhibition of the myriad objects that compose it. "Has any seen the mighty chain of being, lessening down from Infinite Perfection to the brink of dreary nothing—desolate abyss?" has often run through my memory, and never before did I imagine I had come so near to finding an answer to my query. As we pass onward,

insects, and some of their products appear, among which we notice the remarkable web of the *Tinea granella*, or granary moth, which most resembles a sheet of white tissue paper, two feet high and one foot in width. Enormous crustaceans, spiders, &c., may next be seen, all brought so near to the observer that he can study them readily. We soon find that we are following a *linear* arrangement, a system of classification which modern research and wider philosophy have shown is but an imperfect illustration of the thought of the Creator.

Many learned naturalists have labored at the construction of systems of classification, but each succeeding scheme has given way before increasing knowledge of the relations of groups. Whether we suppose relations represented in a linear arrangement or in a circular one, in which circle touches circle within circle, or as a sphere in which is contained a multitude of minor spheres representing classes, groups or genera touching on many sides—all have proved artificial, all have failed to reflect the facts of nature, as later insight has proved them to be mutually related. The *key* to the cause of the multiplex relations of animal forms not having been found, every effort to present them aright could but prove unsuccessful. Recent discoveries in embryology and palæontology, having thrown a flood of light upon the intricacies of this question, by their wonderful illustration of the doctrine of development *arrested* and *accelerated*; the *key* to a correct system of classification in the vegetable and animal world, it is believed has at length been placed in our hands.

The study of living forms alone cannot guide us to the construction of a system that shall explain the relations of genera in the animal and vegetable worlds. As the relation between the living men and women of this generation can only be satisfactorily illustrated by tracing their respective genealogies back to some common ancestry, from which they have derived their similarity of physique, physiognomy or mental traits, and their minor diversities, so we must discover and study the originals which gave rise to the multiform representatives of ages of development therefrom, as found in the genera and families in the world of nature at large. Palæontology, therefore, becomes a guide to the determination of the order of successive forms through which the predecessors of the living plants and animals have passed. A more profound acquaintance with those ancient forms, and with

the changes through which they have passed, is demanded before a system can be made, perfectly adapted to the illustration of the infinite modifications of the living. How widely has expanded the range of the science that was once thought only worthy of triflers and silly enthusiasts ! It has become co-extensive with the origin and destiny of all things, its limits are time, its range the universe ; its philosophy, all-comprehensive, is bound up with human progress and human destiny.

But we will not longer detain the visitor anxious to advance. From enormous crustaceans we proceed directly to mammifers and the skeletons of birds, &c. Not such is the order of nature, we observe, and retire upon our philosophy to wait until evolution shall have prepared for us the system that will show us how from the lower forms sprang fishes, from fishes reptiles, from reptiles birds, and how from batrachians were produced higher forms, culminating in mammifers and eventually in bimana and hence man. We gladly acknowledge that an outline of this system has been effectively foreshadowed.

In a large room the birds, ever pleasing, are displayed to advantage, not being crowded into limited space, as is our unrivaled collection in the "Academy of Natural Sciences" in Philadelphia. In another section Dr. Enrico Hillyer Giglioli, professor of zoölogy in the "Royal Institute for Superior Studies," and director of the Museum of Zoölogy, has prepared and arranged in a suite of noble saloons, a nearly complete exhibition of the fauna of Italy. This is the first of its kind for an entire kingdom that I have seen, and I found it a very striking and rich treat.¹

¹ This grand central collection of Italian vertebrates contains, at the present date (May, 1883), 22,331 specimens of 1139 species of Italian animals. Of these there are 1500 mammals representing 108 species, and the collection is pronounced complete. There are 2200 specimens of birds representing 415 species, which nearly complete the series. Reptiles number 2754 specimens of forty-one species, which complete the series found in Italy. Of Amphibia there are 1830 specimens of twenty-one species, and this number includes every known species in the kingdom. Finally, there are the vast number of 14,048 specimens of fish, representing a collection of 554 species, which is pronounced nearly complete.

To Professor E. H. Giglioli we are indebted for the discovery of an ocean fauna in the Mediterranean. It was during his researches in the steamer *Washington*, a government vessel commissioned for deep-sea dredging, placed at his disposal, that he made the important discovery above stated in August, 1878. His announcement of this discovery appeared in *Nature* of 25 Aug. of that year, and his report was published in the "Acts of the Third International Geographical Congress," Vol. II, Venice, 1881.

Professor Giglioli is a genial gentleman of English and Italian parentage, and his language proves that he learned it at his mother's knee. His collection is worthy of the highest commendation, and his success should stimulate other kingdoms and peoples to emulate the example of Italy. To the generous kindness of Professor Giglioli I must acknowledge my indebtedness for many courtesies.

The anatomical preparations in this museum are interesting and of extraordinary character, unrivaled elsewhere. The art of preparing waxen models so that they can scarcely be distinguished from natural objects was brought to perfection by a Sicilian noble of Syracuse, named Zumbo, who was born in 1656. The report of his wonderful skill having reached the Grand Duke Cosmo III., Zumbo was invited to Florence. He afterwards left Tuscany for Marseilles, where he was patronized by Louis XIV., and died in 1703.

The waxen preparations exhibiting the internal structure of the Torpedo, are wonderfully life-like, having the appearance of real flesh. They illustrate the experiments made by Tain and Matteucci in animal electricity. Here are also magnified illustrations of the anatomy of the lobster, cuttle-fish, earth-worm and tongues of mollusks, the latter in gigantic enlargement. Also the internal anatomy of the silk-worm, of the domestic cat, goat, rabbit, cod-fish, and the several stages of the development of the chick from the egg of a hen, through the twenty-one days of incubation. The muscular fibers and tracheæ of a common fly are magnified 900 diameters or 729 million times in volume. This exhibit is one of the most remarkable evidences of the transcendent skill of the artist.

In adjoining rooms are displayed, of life size, a multitude of illustrations of human anatomy. In one, the arteries of the entire frame are represented in true color, form and place, standing out alone; and in another the veins appear by themselves, while in a third the arteries and veins are seen with all their intimate inter-osculations. In a fourth the observer is introduced to his nervous system, and its wonderful net-work of white cords is seen interlacing and enveloping the entire anatomy of veins, arteries, bones and muscle, the skin alone having been removed. Every stage of dissection is illustrated, every organ is represented, from the hair to the toe-nails, and the visitor might for a moment imagine him-

self transferred to the midst of a dissecting-room with all its ghastly surroundings. His consciousness that these animal forms and repelling developments are but waxen models, preserves him from losing his equilibrium, or he would be prompted to flee in horror from the scene. The sickening exhibition of several stages of the progress of the plague, that once disgraced this series with its disgusting details, with other preparations, thanks to an awakened sense of propriety, have been removed to a private room.

The value of these models can scarcely be deemed commensurate with the expense incurred in their preparation. Many, however, who would not enter a dissecting room, who could not contemplate the real organization, may here learn much respecting their internal economy—learn that they are “fearfully and wonderfully made.” It cannot be of equal service to him who would know the inner workings of the human machinery, since he can be satisfied only by the dissection of the structure once endowed with life. It were better to limit their examination to the select few, rather than expose them to the gaze of the frivolous and debased.

The palæontological collection was formed by order of the government from material already in the museum, with additions made thereto in answer to resolutions passed by the third Scientific Congress held at Florence, which recognized its value and recommended the enlargement by an exhibition of representative minerals and geological specimens from all parts of Italy. The collection having outgrown the limits of the museum on the Via Romana, was removed to extensive rooms on Piazza San Marco, where also is located the “Royal Institute for Higher Studies,” established since the accession of Victor Emmanuel in 1861: Chairs of geology, metallurgy and mining were then established, under the charge of competent professors, for a new life has been breathed into Italy.

This museum abounds in fossil mammals from the valley of the Upper Arno, and has also numerous fossils from the Cretaceous. Some of the elephants are truly colossal, rivaling the mightiest mastodon of North America, specimens of which also are here exhibited.

Elephants must have abounded in the upper valleys, and the abundant remains of this species and of rhinoceros, hippopotamus, found in a deposit that probably once formed the bottom of

a fresh-water lake, indicate that their carcasses were washed there by the flowing waters, and sank eventually to its bottom. The mammals of this section have been studied by Dr. Falconer, who has published numerous observations thereon. Among the more interesting may be named *Elephas meridionalis* (Nesti), *Rhinoceros etruscus* (Falconer), *R. megarhinus* (Christolf), *Hippopotamus major* (Cuvier), *Bos etruscus* (Falconer), *Equus stenonis* (Cocchi), *Cervus dicranios* (Nesti), *C. ctinoides* (Nesti), and *Bos primigenius* (Blum.).

This museum has known its seasons of struggle with adverse circumstances, connected with the rise and fall of rulers during the latter part of the last and early in this century, and was not placed upon a firm foundation until the establishment of Victor Emmanuel upon the throne of Italy in 1861.

Credit is due the Grand Duke Leopold of Tuscany, who employed Fontaina to collect objects illustrative of natural history, purchased the palace of the Bini and opened the museum to the public in 1780. During the days of Bonaparte ascendancy, the new Queen of Etruria added a school of "public instruction" and founded chairs in astronomy, physics, anatomy, zoölogy, mineralogy, botany and chemistry, which was maintained for seven years, until the downfall of the Napoleonic kingdom and restoration of the Grand Duke, when the school was suppressed. Nearly twenty years passed, and it was revived, and again at the accession of Victor Emmanuel, when the institution for more advanced studies was founded, and chairs of geology, metallurgy and mining were added, and courses of lectures annually delivered.

The shackles of spiritual tyranny having been unbound and the equally hard bands of classical devotion loosed, Italy has at length let in the light her unwise rulers sought to hide, and a new life is stirring in the veins of her children. If true to herself, and in the employment of her opportunities, if earnest in efforts for wider culture, and wise in her choice of science as the intellectual trainer of the growing mind, and if open to the reception of a sound Christian faith, attended by a corresponding advance in her moral sense, she may happily take again the place she once had as the first among the nations.